IN THE TITLE:

The title has been amended herein. Pursuant to 37 C.F.R. §§ 1.121 and 1.125 (as amended to date), please enter the title as amended.

~~LOW-COST~~LOW COST, LOW-DENSITY, ABLATIVE RUBBER INSULATION FOR ROCKET MOTORS

IN THE SPECIFICATION:

Please replace paragraph number **[0003]** with the following rewritten paragraph:

[0003] State of the Art: As illustrated in ~~FIG. 1~~ FIGS. 1a and 1B, a conventional rocket motor 2 comprises a case 4 or shell produced from a rigid, durable material, such as a metal or composite. The case houses a solid propellant grain 6 that combusts to provide the thrust necessary to propel the rocket motor 2. An insulation layer 8 is deposited between the case 4 of the rocket motor 2 and the propellant 6 to protect the case 4 from heat and particle streams that are generated during operation of the motor. The insulation layer 8 is comprised of an insulation material that is capable of withstanding high temperatures (approximately 2760°C or 5000°F) and high interior pressures (approximately 1500 psi) that are produced upon combustion of the propellant 6. If the insulation material is not capable of withstanding these temperatures and pressures, the heat and particle streams erode the insulation layer 8, leaving the case 4 susceptible to melting or degradation, which may ultimately lead to failure of the rocket motor 2.

Please replace paragraph number **[0004]** with the following rewritten paragraph:

[0004] Rocket motor insulation materials have typically used filled and unfilled rubbers and plastics, such as phenolic resins, epoxy resins, ~~high~~ high-temperature melamine-formaldehyde coatings, and polyester resins. In addition, elastomers have been used due to their desirable mechanical, thermal, and ablative properties. For example, ethylene propylene diene monomer ("EPDM") rubbers, also known as EPDM polymers, have been commonly used in insulation materials. However, some elastomers have poor thermal properties and poor mechanical properties, such as elongation capabilities and tensile strength. Therefore, an EPDM polymer is commonly combined with flame-retardants and fillers to improve these properties. The flame-retardants are inorganic or organic compounds. The fillers are typically organic-based or carbon fibers and are used to reinforce the elastomers and to prevent or slow down the decomposition of the insulation material.

Please replace paragraph number **[0007]** with the following rewritten paragraph:

[0007] In U.S. Patent Application Publication 2002/0018847 to Guillot, an EPDM rocket motor insulation is disclosed. The insulation comprises an EPDM polymeric matrix dispersed with carbon fibers. The insulation also comprises an inorganic or organic ~~flame-retardant~~ flame-retardant, such as a chlorinated hydrocarbon. In this rocket motor insulation, the organic ~~flame retardant~~ flame-retardant DECHLORANE® is used in combination with antimony oxide or hydrated alumina.

Please replace paragraph number **[0009]** with the following rewritten paragraph:

[0009] In WO 01/04198 to Harvey *et al.*, a rocket motor insulation that comprises an ~~elastomer base~~ elastomer-based polymer, such as NORDEL® IP 4640, and hydrophilic silica particles coated with a hydrophobic coating is disclosed. The insulation also comprises an organic flame-retardant, such as DECHLORANE®, in combination with antimony oxide or hydrated alumina.

Please replace paragraph number **[0013]** with the following rewritten paragraph:

[0013] Currently, silica-filled and fiber-filled insulation materials are commonly used in rocket motors. The silica-filled insulation materials have a low density and good mechanical properties while the fiber-filled insulation materials ~~are~~ have a high ~~density~~ density, ~~and have~~ poor mechanical properties and a higher cost. However, the silica-filled insulation materials have inferior ablative properties in comparison to the fiber-filled insulation materials. Thus, the fiber-filled insulation materials exhibit better ablative properties but at the ~~expense~~ detriment of cost, higher density, and inferior mechanical properties.

Please replace paragraph number **[0015]** with the following rewritten paragraph:

[0015] Since the three sections of the rocket motors are exposed to different conditions, different insulation materials are desirable to adequately protect the different sections. For example, in a Castor-120 motor, two insulation materials are used. A low-cost, low-density

silica-filled EPDM ("SFEPDM") is used in a low-Mach environment (the low-section or cylinder region). An expensive, difficult to handle, high-density KEVLAR® filled EPDM ("KFEPDM") is used in the high-Mach environment (the mid- and high-sections or the aft and forward dome of the motor, respectively) due to its improved ablative characteristics. While using different insulation materials provides the requisite ablative properties, insulation ~~lay up~~ layup using multiple insulation materials is expensive and the use of a high-density ~~rubber~~ rubber-like KFEPDM reduces the payload capacity of the motor.

Please replace paragraph number **[0017]** with the following rewritten paragraph:

[0017] The present invention relates to an insulation material that is used in a rocket motor. The insulation material comprises a low-density EPDM polymer, at least one ~~flame-retardant~~ flame-retardant, and an organic filler that also functions as a flame-retardant. The organic filler is currently preferred to be a polymeric, organic filler such as polyvinyl chloride.

Please replace paragraph number **[0018]** with the following rewritten paragraph:

[0018] A rocket motor comprising an insulation material is also disclosed. The insulation material comprises a low-density EPDM polymer, at least one flame-retardant, and a ~~polymeric~~ polymeric, organic filler. The insulation material is applied between an inner surface of a case of the rocket motor and a propellant.

Please replace paragraph number **[0019]** with the following rewritten paragraph:

[0019] The present invention also relates to a method of insulating a rocket motor. The method comprises producing an insulation material that comprises a low-density EPDM polymer, at least one flame-retardant, and a ~~polymeric~~ polymeric, organic filler. The insulation material is applied to an inner surface of a case of the rocket motor. The insulation material is subsequently cured to form an insulating layer on the rocket motor.

Please replace paragraph number **[0021]** with the following rewritten paragraph:

[0021] ~~FIG. 1~~FIGS. 1A and 1B are ~~is a~~ schematic ~~illustration~~ illustrations of a conventional rocket motor;

Please replace paragraph number **[0028]** with the following rewritten paragraph:

[0028] The insulation material of the present invention may be used as an insulation layer 8 in a rocket motor 2. The insulation material may comprise an EPDM polymer, at least one flame-retardant, and a polymeric, organic filler. The EPDM polymer of the insulation material may be a low-density, EPDM polymer and may be present in ~~a range~~ range of from approximately 35-90 wt % of the total weight of the insulation material. It is currently preferred that the EPDM polymer be present at approximately 45-75 wt %. It is also contemplated that more than one low-density, EPDM polymer may be used. The low-density, EPDM polymer may be a combination of NORDEL IP® 4640, available from Dupont Dow Elastomers (Wilmington, DE), and KELTAN® 1446A, available from DSM Elastomers (Heerlen, the Netherlands). Other combinations of low-density EPDM polymers may also be used within the scope of the present invention.

Please replace paragraph number **[0029]** with the following rewritten paragraph:

[0029] The at least one flame-retardant may be an inorganic or organic flame-retardant, as known in the art. In addition, a combination of two or more flame-retardants, such as at least one inorganic and at least one organic flame-retardant, may be used. For example, ~~PHOS-CHECK~~ PHOS-CHECK® P-30, an inorganic flame-retardant available from Monsanto (St. Louis, MO), may be used in combination with the inorganic flame-retardants HI-SIL® 532 EP and HI-SIL® 233, both of which are available from PPG Industries, Inc. (Pittsburgh, PA).

Please replace paragraph number **[0030]** with the following rewritten paragraph:

[0030] The organic filler may be used to prevent or slow down the decomposition of the insulation material. The organic filler may be polymeric and may be present at ~~a range~~ range

of from approximately 3-30 wt %. The organic filler may include, but is not limited to, polyvinylchloride ("PVC"), polyphenylene sulfide, melamine, or a homopolymer of vinylidene chloride. The organic filler may be a polymeric, halogenated hydrocarbon. The physical form of the organic filler may be a fiber form, a powder form, or any form in which the organic filler is produced. Preferably, the organic filler is PVC, which is a chlorinated, noncyclic polymer that has one chlorine atom per repeat unit. The PVC may be a fiber, such as RHOVYL® ZCS fibers available from Rhovyl S.A. (Neuilly-sur-Seine, France). The RHOVYL® ZCS fibers have a density of 1.38 g/cc and a length of approximately 60 mm. The PVC may also be a powder, such as OXYVINYLS™ 500F, which is available from OxyVinyls, LP (Dallas, TX).

Please replace paragraph number **[0032]** with the following rewritten paragraph:

[0032] Without being tied to a single theory, it is believed by the inventor that PVC acts as a flame-retardant in synergism with other flame-retardants in the insulation material. Under combustion conditions, PVC decomposes and releases chlorine and chlorine-containing compounds, such as hydrochloric acid. Hydrochloric acid is a good char promoter and forms a char layer on the rubber, thereby protecting it from ablation. While the examples discussed below only refer to chlorine-containing polymers, such as PVC, it is also contemplated that other halogenated polymers that release halogen-containing compounds will have the same effect on the ablation of the insulation material. Halogen-containing compounds are known to be good char promoters and to have ~~flame~~ flame-retarding properties. For example, fluorinated polymers that release hydrofluoric acid will have the same effect.

Please replace paragraph number **[0034]** with the following rewritten paragraph:

[0034] The insulation material may be prepared by various techniques known in the art, such as by using an internal mixer, a BUSS mixer, or a solvation technique. The technique used to form the insulation material may affect the length of the organic filler fiber that is used in the insulation material because each technique causes a varying amount of damage to the fibers. If the insulation material is prepared in the internal ~~mixer,~~ mixer, an insulation lay-up technique is

not critical, which is in contrast to other ~~fiber~~ fiber-filled formulations. In addition, due to the good rheological properties of this insulation material (long scorch time and slow cure rate), cold storage of these materials may not be essential, in contrast to currently used SFEPDM. These factors significantly reduce the manufacturing and processing costs of the insulation material and resulting rocket motor, in addition to helping increase the payload of the rocket motor.

Please replace paragraph number **[0035]** with the following rewritten paragraph:

[0035] The insulation material may be deposited or applied between the case 4 and the propellant 6. Specifically, the insulation material may be deposited or applied on an inner surface of the case 4 of the rocket motor 2, as shown in ~~FIG. 1~~ FIGS. 1A and 1B. Preferably, the insulation material is applied in an uncured form and then cured to form the insulation layer 8. For example, uncured insulation material may be applied to the inside of a formed rocket motor and then cured. In addition, the uncured insulation material may be applied to a mandrel, cured to form the insulation layer 8, and subsequent layers of the rocket motor formed over the insulation layer 8. The insulation material may be cured in a press at approximately 300±10°F for approximately two hours at approximately 100±10 psi. The insulation material may also be cured in an autoclave at approximately 300±10°F at a pressure of approximately 45 psi. The time required to cure the insulation material may depend on the thickness of the insulation material.

Please replace paragraph number **[0037]** with the following rewritten paragraph:

[0037] In addition to being used in rocket motors, the insulation material may be used in other articles where protection from heat and gases is necessary. For example, the insulation material may be used for heat and gas protection in under-the-hood applications in automobiles. The insulation material may also be used in conveyor belts and in ~~noise~~ noise-damping applications in automobile and other fields. In addition, since the insulation material may be extruded, compression molded, or calendered, the insulation material may be used in routine rubber applications including, but not limited to, such applications as hoses, gaskets, seals, isolators and mounts, cushions, air emission hoses, and dock fenders.

Please replace the title appearing above paragraph number **[0038]** with the following:

Example 1

Compositions ~~Of~~ of PVC Insulation Materials

Please replace the title appearing above paragraph number **[0043]** with the following:

Example 2

Preparation ~~Of The~~ of the PVC Insulation Materials

Please replace the title appearing above paragraph number **[0048]** with the following:

Example 3

Rheological ~~And~~ and Physical Properties ~~Of The~~ of the PVC Insulation Materials

Please replace paragraph number **[0048]** with the following rewritten paragraph:

[0048] The rheological and physical properties of the PVC insulation materials described in Examples 1 and 2 are shown in Tables 2 and 3. The properties of RDL5815, RDL5840, RDL5841, and RDL5844 were compared to the properties of insulation materials that are currently produced and used. The current insulation materials included an ~~asbestos~~ asbestos-filled nitrile butadiene rubber ("ASNBR") composition, a silica-filled EPDM ("SFEPDM") composition, a carbon-filled EPDM ("CFEPDM"), and a KEVLAR® filled EPDM ("KFEPDM") composition.

Please replace paragraph number **[0049]** with the following rewritten paragraph:

[0049] Table 2: Rheological Properties ~~Of The~~ of the PVC Insulation Materials ~~In~~ in Comparison ~~To~~ to Current Production Insulation Materials.

Rubber	Physical Form	% (By Weight)	Mooney Viscosity (212°F)	Mooney Scorch (250°F)	TS2 (300°F)	TC90 (300°F)
RDL5815	PVC Fiber	13.48	67 -71	38-39	5.2-5.7	58-62
RDL5840	PVC Powder	13.48	77	38.6	5.6-5.7	47-51
RDL5841	PVC Fiber	13.48	-	35.7	5.4	55
RDL5844	PVC Fiber	18.78	79-95	31-35	4.9	51-53

Please replace paragraph number **[0050]** with the following rewritten paragraph:

[0050] Table 3: Physical Properties ~~Of The~~ of the PVC Insulation Materials ~~In~~ in Comparison ~~To~~ to Current Production Insulation Materials.

Rubber	Physical Form	% (By weight)	Density (g/cc)	Hardness (Shore A)
RDL5815	PVC Fiber	13.48	1.081	66.2
RDL 5840	PVC Powder	13.48	1.080	68.8
RDL5841	PVC Fiber	13.48	-	-
RDL5844	PVC Fiber	18.78	1.078	73.6

Please replace paragraph number **[0052]** with the following rewritten paragraph:

[0052] RDL5841, which ~~had~~ had a longer fiber length, exhibited a reduced scorch time and slightly reduced TC90 value in comparison to RDL5815. RDL5840, which comprised PVC in powder form, did not have any effect on scorch time but had an increased Mooney viscosity and slightly reduced TC90 value in comparison to RDL5815. In addition, as expected, RDL5840 had approximately the same density as RDL5815.

Please replace the title appearing above paragraph number **[0053]** with the following:

Example 4

Mechanical Properties ~~Of The~~ of the PVC Insulation Materials

Please replace paragraph number **[0054]** with the following rewritten paragraph:

[0054] Table 4: Mechanical ~~properties~~ Properties of the PVC ~~insulation~~ Insulation ~~materials~~ Materials in ~~comparison~~ Comparison to ASNBR, SFEPDM, and KFEPDM ~~compositions~~ Compositions.

Formulation	Physical Form	Tear Strength (PSI)	Tensile Strength		Elongation		Hardness
			// (PSI)	⊥ (PSI)	// %	⊥ %	Shore A
RDL5815	PVC Fiber	211	1630-1690	1520-1660	592-638	602-635	66.2
RDL5840	PVC Powder	219	2000		613		68.8
RDL5844	PVC Fiber	211	765	627	386	365	73.6

Please replace the title appearing above paragraph number **[0057]** with the following:

Example 5

Ablative ~~performance~~ Performance of the PVC ~~insulation materials~~ Insulation Materials

Please replace paragraph number **[0057]** with the following rewritten paragraph:

[0057] To determine whether the fiber length had an effect on the ablative performance of the PVC insulation materials, a low-mach char motor was fired using RDL5815, RDL5840, RDL5841, RDL5844, and the current production insulation materials ASNBR (7232) and KFEPDM (RDL5067). As shown in FIGS. 4-7, RDL5815 and ~~RDL 5840~~ RDL5840 exhibited improved or at least comparable ablative performance in comparison to the ASNBR and KFEPDM insulation materials. RDL5815, which is almost 15% lighter than the KFEPDM insulation material, performed better than the KFEPDM in all three sections of the motor. The results also indicated that RDL5815 performed similar to ASNBR in all three sections of the motor.

Please replace paragraph number **[0059]** with the following rewritten paragraph:

[0059] The PVC insulation materials performed similar to and slightly better than RDL5067 in all three sections of a low-Mach char motor. The four PVC insulation materials performed equally well. The fiber length had no positive effect on the ablative performance in the Mach number range observed by the low-Mach char motor. Out of the PVC insulation materials, RDL5840 had slightly better ablative properties than RDL5815, which may be due to intimate mixing that is achieved when the PVC ~~in the~~ is in powder form.

Please replace the title appearing above paragraph number **[0062]** with the following:

Example 6

RDL5815 Use ~~In The~~ in the Castor 120 Motor

Please replace the title appearing above paragraph number **[0064]** with the following:

Example 7

Rheological ~~And~~ and Physical Properties ~~Of~~ of PVC Insulation Materials Having Varying Amounts ~~Of~~ of PVC

Please replace paragraph number **[0065]** with the following rewritten paragraph:

[0065] Table 5: Rheological Properties ~~Of~~ of PVC Insulation Materials ~~With~~ with Varying PVC Content

Rubber	PVC		Mooney Viscosity	Mooney Scorch	TS2 (ODR)	TC90 (ODR)	Cure Rate Index (RPA)
	Content (% by wt)	Physical Form	(212°F)	(250°F)	(300°F)	(300°F)	
RDL5859	5.9	Fiber	67.6	41.0	5.61	53.68	3.022
RDL5815	13.5	Fiber	71.2	38.8	5.55	58.58	2.826
RDL5860	20	Fiber	78.6	37.1	5.67	66.15	2.495
RDL5862	5.9	Powder	67.9	39.7	5.53	47.01	3.231
RDL5840	13.5	Powder	77.32	38.6	5.59	46.92	2.916
RDL5863	20	Powder	82.54	39.32	5.52	55.41	2.638

Please replace paragraph number **[0066]** with the following rewritten paragraph:

[0066] Table 6: Physical Properties ~~Of~~ of PVC Insulation Materials ~~With~~ with Varying PVC Content

Rubber	PVC		Density	Hardness	Ash Content
	Content (% by wt)	Physical Form	g/cc	Shore A	%
RDL5859	5.9	Fiber	1.0573	61.6	22.51
RDL5815	13.5	Fiber	1.0801	66.2	20.62
RDL5860	20	Fiber	1.1013	71.6	19.07
RDL5862	5.9	Powder	1.0568	63.6	22.41
RDL5840	13.5	Powder	1.0796	67.0	-
RDL5863	20	Powder	1.0942	73.2	18.96

Please replace the title appearing above paragraph number **[0068]** with the following:

Example 8

Mechanical Properties ~~Of~~ of PVC Insulation Materials Having Varying Amounts ~~Of~~ of PVC

Please replace paragraph number **[0069]** with the following rewritten paragraph:

[0069] Table 7: Mechanical Properties of PVC ~~insulation materials~~ Insulation Materials with ~~varying~~ Varying PVC Content

Rubber	PVC		Tensile Strength (psi)		Elongation (%)		Tear Strength (psi)
	Content (% by wt)	Physical Form	//	⊥	//	⊥	
RDL5859	5.9	Fiber	1920	2060	605	628	205
RDL5815	13.5	Fiber	1690	1660	592	602	211
RDL5860	20	Fiber	1280	1200	582	593	206
RDL5862	5.9	Powder	2380		645		197
RDL5840	13.5	Powder	2000		613		219
RDL5863	20	Powder	1480		578		216

Please replace paragraph number **[0070]** with the following rewritten paragraph:

[0070] The tensile strength, elongation, and tear strength of these insulation materials are significantly high. For ~~fiber~~ fiber-filled insulations, the highest value for tensile strength was observed for RDL5859, which was the lowest tested amount of PVC. These insulation materials showed a very small amount of anisotropy with values in parallel and perpendicular directions differing by a small amount, which indicates that during internal mixing, fibers were dispersed randomly in the EPDM. The fiber PVC insulation materials had slightly inferior mechanical properties than the powdered PVC insulation materials.

Please replace paragraph number **[0071]** with the following rewritten paragraph:

[0071] In order to optimize the insulation materials and reduce the number of components, two additional insulation materials were prepared and tested. In RDL5874 and RDL5875, the amounts of AGERITE® Stalite S, AGERITE® HP-S, HI-SIL® 532 EP, and ~~HI-SIL~~ HI-SIL® 233 were adjusted while keeping the amount of RHOVYL® ZCS fibers constant.

Please replace paragraph number **[0073]** with the following rewritten paragraph:

[0073] The rheological, physical, and mechanical properties of these insulation materials compared to ~~RDL 5815~~ RDL5815 are shown in Tables 9-11.

Please replace paragraph number **[0077]** with the following rewritten paragraph:

[0077] By adjusting the amounts of AGERITE® Stalite S, AGERITE® HP-S, ~~HI SIL~~ HI-SIL® 532 EP, and HI-SIL® 233 in the insulation material, the scorch time was reduced and the formulation cured at a slightly faster rate. By increasing the amount of PHOS-CHECK®, the scorch time was unaffected but the system cured at a faster rate and the Mooney viscosity of the rubber reduced slightly.

Please replace paragraph number **[0078]** with the following rewritten paragraph:

[0078] The data in Table 9 indicated that by reducing the amount of HI-SIL® in the formulation (from 35 parts per hundred ("phr") to 30 phr), the density of the rubber reduced from 1.08 to 1.07g/cc. However, at the HI-SIL® content of 30 phr, the density increased to 1.08 g/cc when the PHOS-CHECK® amount ~~as~~ was increased from 2 phr to 7 phr. As shown in Table 11, by reducing the amount of HI-SIL® in the formulation from 35 phr (RDL5815) to 30 phr (RDL5874), the tensile strength increased to 1960 and 1750 psi in the parallel and perpendicular directions, respectively. The tear strength decreased slightly to 206 psi from the value of 211 psi for RDL5815. By increasing the amount of PHOS-CHECK® in RDL5874, the tensile strength decreased slightly to 1860 and 1710 psi in the parallel and perpendicular fiber directions, respectively. By increasing the amount of PHOS-CHECK®, the tear strength of the formulation was unaffected and stayed at 206 psi.

Please replace paragraph number **[0079]** with the following rewritten paragraph:

[0079] To determine the ablative performance of the PVC insulation materials described in Example 9, a low-Mach char motor was fired using six different PVC insulation materials. Five of the six formulations were the PVC insulation materials RDL5859 (5.9% PVC fiber), RDL5815 (13.5% PVC fibers), RDL5860 (20% PVC fibers), RDL5874 (13.5% PVC fibers) and RDL5875 (13.5% PVC fibers). ~~RDL-5874~~ RDL5874 and ~~RDL-5875~~ RDL5875 differed from ~~RDL-5815~~ RDL5815 in the amount of flame-retardant. The sixth formulation, ~~RDL-5840~~ RDL5840, had 13.5% by weight of powdered PVC. The results of this char motor are shown in FIGS. 13-16.

Please replace paragraph number **[0080]** with the following rewritten paragraph:

[0080] As FIG. 13 indicates, RDL5840 gave good performance up to a Mach number of 0.028. Beyond that Mach number, this formulation performed poorly. RDL5859 provided better performance in the low-Mach motor environment than the insulation materials with higher amounts of PVC fibers. ~~RDL-5875~~RDL5875, which had a larger amount of PHOS-CHECK®

and a smaller amount of HI-SIL®, performed slightly better than RDL5815 and RDL5874, which had a ~~greater~~ larger amount of HI-SIL® and ~~less~~ smaller amount of PHOS-CHECK®. In the high-Mach number region, the fiber-filled PVC insulation material performed better than the powder-filled PVC insulation material.

Please replace the title appearing above paragraph number **[0081** with the following:

Example 11

Comparison ~~Of~~ of RDL5815 ~~And~~ and RDL5837

Please replace paragraph number **[0081]** with the following rewritten paragraph:

[0081] In a char motor test, RDL5815 was slightly inferior to RDL4799 (KFEPDM) above the Mach number of 0.05. Therefore, RDL5837, which comprises PVC fibers and carbon fibers, was prepared to check the ablative characteristics in the high section of a mid-Mach motor and to predict performance in the high-Mach motor. As shown in FIGS. 17-19, RDL5815 had similar performance to RDL4799 and was better than 6850 (baseline CFEPDM) in the ~~mid-~~ mid-section of the ~~mid-mach~~ mid-Mach motor. In addition, in the high-section, RDL5815 performed similarly to RDL4799 up to the Mach number of 0.05. Beyond that Mach number, RDL5815 showed inferior performance to RDL4799.

AMENDMENTS TO THE ABSTRACT:

Please replace the Abstract originally appearing on page 27 of the application with the following rewritten paragraph:

ABSTRACT OF THE DISCLOSURE

An insulation material comprising a low-density EPDM polymer, at least one ~~flame-~~ flame-retardant, and an organic filler. The insulation material is used in an insulation layer of a rocket motor. The organic filler is a polymeric, organic filler such as polyvinyl chloride. A rocket motor comprising an insulation material is also disclosed. The insulation material comprises a low-density EPDM polymer, at least one flame-retardant, and a ~~polymeric~~ polymeric, organic filler and is applied between an inner surface of a case of the rocket motor and a propellant. A method of insulating a rocket motor is also disclosed.

IN THE CLAIMS:

No claims have been amended herein. All of the pending claims 1 through 20 are presented below. This listing of claims will replace all prior versions and listings in the application.

1. (Original) An insulation material for use in a rocket motor, comprising:
a low-density ethylene propylene diene monomer polymer;
at least one flame-retardant; and
a polymeric organic filler.

2. (Original) The insulation material of claim 1, wherein the at least one flame-retardant comprises at least one organic flame-retardant and at least one inorganic flame-retardant.

3. (Original) The insulation material of claim 1, wherein the polymeric organic filler comprises a chlorinated hydrocarbon.

4. (Original) The insulation material of claim 1, wherein the polymeric organic filler comprises a noncyclic hydrocarbon.

5. (Original) The insulation material of claim 1, wherein the polymeric organic filler comprises at least one chlorine atom per repeat unit.

6. (Original) The insulation material of claim 1, wherein the polymeric organic filler comprises polyvinyl chloride.

7. (Original) A rocket motor, comprising:

an insulation material disposed between an inner surface of a case of the rocket motor and a propellant, the insulation material comprising a low-density ethylene propylene diene monomer polymer, at least one flame-retardant, and a polymeric organic filler.

8. (Original) The rocket motor of claim 7, wherein the at least one flame-retardant comprises at least one organic flame-retardant and at least one inorganic flame-retardant.

9. (Original) The rocket motor of claim 7, wherein the polymeric organic filler comprises a chlorinated hydrocarbon.

10. (Original) The rocket motor of claim 7, wherein the polymeric organic filler comprises a noncyclic hydrocarbon.

11. (Original) The rocket motor of claim 7, wherein the polymeric organic filler comprises at least one chlorine atom per repeat unit.

12. (Original) The rocket motor of claim 7, wherein the organic filler comprises polyvinyl chloride.

13. (Original) The rocket motor of claim 7, wherein the polymeric organic filler comprises polyvinyl chloride.

14. (Original) A method of insulating a rocket motor comprising:

producing an insulation material comprising a low-density ethylene propylene diene monomer polymer, at least one flame-retardant, and a polymeric organic filler; and

applying the insulation material to an inner surface of a case of the rocket motor.

15. (Original) The method of claim 14, wherein producing an insulation material comprising at least one flame-retardant comprises producing an insulation material comprising at least one organic flame-retardant and at least one inorganic flame-retardant.

16. (Original) The method of claim 14, wherein producing an insulation material comprising a polymeric organic filler comprises producing an insulation material comprising a chlorinated hydrocarbon.

17. (Original) The method of claim 14, wherein producing an insulation material comprising a polymeric organic filler comprises producing an insulation material comprising a noncyclic hydrocarbon.

18. (Original) The method of claim 14, wherein producing an insulation material comprising a polymeric organic filler comprises producing an insulation material comprising at least one chlorine atom per repeat unit.

19. (Original) The method of claim 14, wherein producing an insulation material comprising a polymeric organic filler comprises producing an insulation material comprising polyvinyl chloride.

20. (Original) The method of claim 14, further comprising:
curing the insulation material to form an insulation layer positioned between the inner surface of the case of the rocket motor and a propellant.

REMARKS

No new matter has been added. The amendments to the claims address typographical and spelling errors, and improve antecedent basis. The amendments do not affect, or surrender, any scope of any claim as originally filed.

The Applicant again requests entry of the amendments as set forth herein prior to examination of the application on the merits.

Respectfully submitted,

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Date: September 26, 2003

JAW/tlb

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